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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

V.63 n.15

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APR 14 '53
DETROIT

"Regulus" Roars

See Page 229

A SCIENCE SERVICE PUBLICATION

BIOCHEMISTRY

High Temperature Plant

Find strain of green alga, operating at relatively high temperature, that converts sunshine into food at efficiency five times that of any previously known photosynthetic organism.

➤ A STRAIN of a one-celled green plant that can carry on the process of converting the energy of sunshine into food with five times the efficiency of any previously known has been discovered.

It is a strain of the green alga *Chlorella*. This efficient plant, which wastes less sunshine than any other, operates at the high temperature of 39 degrees Centigrade, or 102.2 degrees Fahrenheit. It produces 100 times its own cell volume of oxygen per hour instead of the 20 times produced by most photosynthetic organisms over sustained periods.

This *Chlorella* strain, known as Tx 71105, was isolated from warm surface waters by Drs. Constantine Sorokin and Jack Myers at the University of Texas, Austin, Tex., and the Carnegie Institution of Washington, Stanford, Calif. Its discovery is reported in *Science* (March 27).

The fact that this plant can survive and grow at this relatively high temperature and operate so efficiently for sustained periods is considered significant for practical attempts at algae "farming" to capture the plentiful sunshine for energy or to increase the world's food supply.

Increasing the efficiency of the photosynthetic process has long been an aim of scientists. Some have thought that if this could be done and a sort of artificial green plant developed, the world might be freed of dependence for energy on coal, oil, gas, wood and other fuels. Synthetic food should then be just around the corner.

Heretofore scientists working on this problem have worked with *Chlorella* growing at the lower temperatures of 25 degrees Centigrade, 77 degrees Fahrenheit, because it was thought these one-celled plants would not thrive at higher temperatures. Keeping a dense mass of them at this temperature under bright sunlight has been difficult.

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CYTOLOGY

Stomach Cancer Detection

➤ EARLY DETECTION of stomach cancer probably can be achieved best by microscopic examination of cells taken from the stomach lining.

This is indicated by a report by a group of University of California School of Medicine doctors in *Surgery, Gynecology and Obstetrics* (Dec., 1952).

The detection technique, called cytological diagnosis, has been used successfully in cervical and lung cancer. Its application to stomach cancer has been difficult because of the trouble encountered in obtaining cells direct from the stomach wall.

The California scientists have overcome this problem by the use of papain to digest and remove the mucous layer overlying the stomach wall.

The papain technique has now been used on 400 patients, and a marked improvement is noted over results obtained in a study of 600 patients on whom conventional methods of getting stomach cells were used.

With papain, 30, or 71.4% of 42 proved malignancies were detected, an improvement over the 51.1% diagnosis by conventional methods. A review of the data on the 400 patients shows that improvements during the course of the papain study can raise the accuracy to about 85%.

The doctors pointed especially to the detection of five early cancers in which diagnosis by X-ray was either questionable or in error. Before cytological diagnosis, ulcers had been diagnosed in four of the patients, multiple polyps in a fifth. In all five cases, the cancers were detected and removed before they had a chance to spread.

"There is growing evidence that cytology is the most efficient means of diagnosing early lesions," said the scientists, Drs. Milton Rosenthal, Seymour M. Farber and Orville F. Grimes, and James T. Harrison.

If the tests are used in individuals over 35 years of age who complain of chronic indigestion, many early, operable cases of cancer would be uncovered, they added, thus reducing mortality from this source.

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VETERINARY MEDICINE

Brucellosis Threatened To Buffalo the Buffalo

➤ BRUCELLOSIS THREATENED to buffalo the buffalo but modern veterinary science has saved the American bison from extinction. Vaccination has brought the disease, known also as Malta fever and undulant fever, under control at the Wichita Mountain Wildlife Refuge in Oklahoma, home of the world's largest bison herd. The vaccine was the same type used to protect cattle.

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• RADIO

Saturday, April 18, 1953, 3:15-3:30 p.m. EST.

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS Station.

Dr. Samuel N. Stevens, president of Grinnell College, Grinnell, Iowa, discusses "Scientific Training in the Small College."

INVENTION

Grow Grass Under Bituminous Layer

➤ A LAYER of gravel topped with a layer of bituminous emulsion over the seed bed of a grass lawn gives remarkable results in the speeding up of the germination of the seed, according to a British inventor who patented this method.

The bituminous emulsion keeps out water from the atmosphere and also prevents evaporation of water in the soil. The inventor finds that the grass then draws up just the right amount of water from underneath and that the temperature is raised, thus giving a hothouse-like atmosphere.

The gravel is used because the young shoots of grass are, at first, too tender to push their way through the bituminous emulsion. However, once they grow through the gravel, it is claimed, they are tough enough to break through the top layer. Once the grass pushes through, more moisture from the atmosphere can get into the ground through the holes made by the blades. Inventor is Thomas F. N. Alexander, Bristol, England, and his patent number is 2,632,979.

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PSYCHIATRY

Do Not Count Sheep; Fix Eyes on Landscape

➤ NEXT TIME you cannot get to sleep because exciting or disturbing ideas keep flitting through your mind, try the following:

Imagine a beautiful, restful landscape in summer with which you are familiar. Go through all the details of the picture and at last concentrate your "field of vision" on a small part of it. Try to keep seeing this small part in your imagination. If outside thoughts interfere, which they always do to begin with, start all over again taking the same picture and concentrating on the same point in it.

This method is better than counting sheep, whether backwards or forwards, says the Danish psychiatrist, Dr. Gudmund Magnussen. The reason is that while counting sheep you can go right on being disturbed by other thoughts, but with the landscape method the interfering emotional thoughts are kept away. Dr. Magnussen gives this method in a report to the National Association for Mental Health in New York.

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$$g_{ik;s} = 0, \qquad \Gamma_i = 0$$
$$R_{ik} = 0, \qquad R_{ik,l} + R_{kl,i} + R_{li,k} = 0$$

EINSTEIN'S LATEST EQUATIONS — The most recent revision of Einstein's concepts about the universe are shown above. The equations reconcile, he believes, previous conflicts in his goal of a unified theory.

PHYSICS

Einstein Revises Theory

After three years of study, Einstein has issued an up-to-date version of his equations aimed at completely describing the physical universe in a single theory.

➤ PROF. ALBERT EINSTEIN has revised his generalized theory of gravitation. This may be a major step forward toward the goal of complete description of the physical universe—gravitational, electrical and nuclear forces—by a single theory.

His improved theory is based on a new method which compares the "strength" of different systems of equations. In the earlier version of his theory, published in 1950, a choice of several sets of equations was possible. Now the method which allows choosing a particular set of equations is set forth.

Einstein's earlier doubts concerning the choice of field equations have been dispelled by his new method, although mathematical difficulties have so far prevented checking the theory against known experimental facts.

"Nevertheless, I consider it unjustified to assert, a priori, without examination," Einstein asserts, "that such a theory is unable to arrive at the atomistic character of energy."

The new development takes a large stride toward one of the great aims of theoretical physics, to find a single theory that will describe both gravitation and electromagnetism. It is presented as an appendix to the fourth edition of Einstein's book, "The Meaning of Relativity," published by Princeton University Press. (See p. 236.)

Einstein shows how an "approximation" of his generalized gravitation equations leads to two other sets of equations, one of which is a generalization of Maxwell's famous electromagnetic equations.

This, Einstein states, "makes it understandable why the electromagnetic and gravitational fields seemed so independent of one another in the previous development of our knowledge about the behavior of weak fields. In the more rigorous theory this independence no longer holds."

The new theory runs directly against the main current of modern physical thought. It is a "field theory" rather than a "particle theory" such as is favored by most other physicists.

In a discussion of modern physics, Einstein expresses his belief that attempts "to give a complete description of the real situation with the formalism of the present quantum (particle) theory" must fail.

He explains he has gone to so much trouble to arrive at this result because the contemporary physicist is "convinced, as a result of the successes of the probability-based quantum mechanics, that one must abandon the goal of complete descriptions of real situations in a physical theory."

Einstein, however, sees "in the present situation no possible way other than a pure field theory, which then, however, has before it the gigantic task of deriving the atomic character of energy."

It was in 1905 that Einstein suggested that the laws of physics as we observe them may be in no way dependent upon how fast we are moving through space. He proposed that it is only how fast an object is moving relative to us that can affect the way things on this object appear to act.

Scientists found that changes in the properties of objects moving at high speeds could be accounted for by this theory. This theory also stated the equivalence of mass and energy, $E=mc^2$, basic to the atom bomb.

The idea of developing a generalized field theory has been a major goal of physicists since about 1920. A vast store of knowledge has been gained from experiments, but no single theory has previously been able to explain and describe it all.

The world will have to wait to see if the new theory will influence the next half of the century as profoundly as Einstein's theory of relativity did the first half.

Einstein, now at the Institute for Advanced Study in Princeton, was awarded the Nobel Prize for Physics in 1921.

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MEDICINE

Cancer Immunity in Siamese Twin Mice

➤ IMMUNITY TO transplanted cancer has been given to mice in experiments by Drs. Arthur Kirschbaum and Nancy Falls of the University of Illinois College of Medicine, Chicago, the American Cancer Society has announced.

The experiments do "not indicate that humans cured of cancer develop immunity to that type of cancer," the society states.

In the experiments a fatal cancer of lymphatic tissue was transplanted to susceptible mice. Then it was destroyed by X-rays. The treated mice were joined surgically to other, susceptible mice, making them into synthetic Siamese twins.

The cancer was then transplanted to the susceptible twin. Both twins were then able to destroy the cancer. This showed that the immunity produced by one animal could be transferred by continuous cross-blood transfusion to the other.

The immunity was strong for 30 days, present up to 120 days and could be transferred up to 120 days.

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NUTRITION

Cathode Rays Preserve Hamburgers for 60 Days

➤ OLD SALTS can feast on good hamburgers even after 60 days at sea on a ship without a deep freeze. A one-second cathode ray treatment of the hamburgers before sailing will preserve them for 60 days in a refrigerator instead of the usual six.

Fresh spinach and pink (nearly ripened) tomatoes can be preserved by the same method worked out by Massachusetts Institute of Technology scientists for the U. S. Navy. Off-flavors and off-odors caused by irradiation have been eliminated as well as danger of spoilage.

For the future, sterilization of the food so it will keep at room temperature, without refrigeration, is seen possible.

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GENERAL SCIENCE

Scientists Honor Dripolator Inventor

➤ MORE THAN 15 leading scientists gathered in Boston for the bicentennial of the birth of the inventor of the coffee dripolator and the kitchen range.

This pioneer in technical revolution, also known for his studies on heat as motion of matter particles, is Benjamin Thompson, Count Rumford of the Holy Roman Empire, although American born.

Those who have received Rumford medals during the past 35 years attended the celebration of the American Academy of Arts and Sciences in Boston.

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GENERAL SCIENCE

Science Talent Detectable

Science Talent Searches of past 12 years show that aptitude for science can be detected at least by last year of high school, survey of past winners determines.

➤ WHEN IS it possible to tell whether a child will develop into a scientist or engineer? A 12-year experiment has proved it can be determined almost conclusively by the time a boy or girl is a high school senior. There is growing eivdence which indicates that it may be established even at a much earlier age.

Since 1942 the Annual Science Talent Search, conducted by Science Clubs of America, administered by SCIENCE SERVICE, has been in the process of proving that potential scientists can be detected when they are teen-agers.

Each year 40 of the country's most promising high school seniors are named winners. Although it is too soon to say definitely that winners in more recent years are going to be scientists, speculative conclusions seem to have been proved by winners of the first six Science Talent Searches.

Of the 240 who were winners from 1942 through 1947, a total of 225 (over 93%) are now trained scientists and engineers. None is more than 30 years of age.

Undergraduate degrees already are held by 221 of the 240. Among these, 62 have masters' degrees. Doctorates have been conferred upon 41.

Advanced study still takes the full time of 102 of the 240. Industry employs 46. Teaching or research positions in colleges and universities are held by 23. The armed services are using 18. Homemaking and child care claim the full time of 18 of the 63 women winners. Nine practice medicine privately or in hospitals. Eight hold positions in government science laboratories. One winner is chronically ill. Another is deceased. The present occupation of 14 is not known.

As a measure of their ability it is worth noting that of these 240 a total of 74 have been elected to Phi Beta Kappa, general scholarship fraternity, 27 are in Tau Beta Pi, the honorary engineering society, and 67 are already members of Sigma Xi, the science research society.

With the present acute shortage of scientists and engineers, which is further imperiled by drops in school enrollment at the secondary and college levels, any tool which can be used for early detection of latent science talent is highly desirable.

The detection technique has been applied through the Science Talent Search to thousands of high school seniors during the past 12 years. As a result, 3,600 young men and young women—40 winners and 260 honorable mentions each year—have received direct assistance to further their education in science.

A total of $121,000 in Westinghouse Science Scholarships has been awarded through the Science Talent Search, made possible financially by the Westinghouse Educational Foundation.

Additional scholarships, fellowships and other financial assistance to these 3,600 winners has come from many sources. It has amounted to millions of dollars.

A boost to still other hundreds of students has come as the direct results of State Science Talent Searches now in operation in 26 states, working on a cooperative plan with Science Clubs of America.

Through these state searches, additional thousands of dollars worth of scholarships are awarded to promising high school seniors in Alabama, Arkansas, Connecticut, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, West Virginia and Wisconsin.

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PUBLIC HEALTH

World Organization Fights for Health

➤ THE WORLD Health Organization, known informally as WHO, is one of the largest specialized agencies of the United Nations. It is dedicated by its constitution to work for "the attainment by all peoples of the highest possible level of health."

Today WHO, established as a permanent body on Sept. 1, 1948, has a total membership of 82 countries in all parts of the world, including three Associate and 10 inactive Members.

Membership is open to all States, for the aim of WHO is to represent all mankind. But membership is not a condition of assistance. WHO is prepared to give help wherever need exists.

WHO is waging a battle for health, not merely against disease. It operates a system of international radio warning of dangerous epidemic diseases anywhere in the world, as an aid to protection of health everywhere. It establishes standards for uniform strength of drugs throughout the world.

Today, for example, everyone who is given a dose of penicillin, every child who is protected by diphtheria anti-toxin, gets added safety because the dose is measured in international units.

In its work towards promoting physical, mental and social well-being for all, WHO carries out projects for improving the sanitary conditions under which people live, seeks to improve nutrition standards, and pays particular attention to the health needs of mothers and children.

It aims at improving and expanding the nursing services, promotes the development of preventive mental health work and provides services on occupational health and medical rehabilitation.

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A machine has been developed that automatically grades *eggs* according to their color—from white to dark brown.

SCIENCE NEWS LETTER

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FOR 1,700 MILES PER HOUR—Scheduled to undergo flight tests at speeds over twice that of sound is this Bell X-1A. It is slightly larger than the X-1, the first United States supersonic airplane that crashed through the sonic barrier in October, 1947. It is rocket-powered with a liquid oxygen and a special alcohol-water mixture for fuel.

AERONAUTICS

Guided Missile For Subs

Jet-propelled guided missile, known as Regulus, is capable of carrying an atomic warhead from submarine or "several" other types of Navy vessels.

See Front Cover

➤ THE NAVY has created a hard-hitting swept-wing guided missile that can strike at supersonic speeds from submarines, surface ships and shore bases.

Equipped with a deadly warhead, the missile can carry destruction to its target. However, test models of the weapon are outfitted with tricycle landing gears so they can be recovered and studied.

Called the Regulus, the 30-foot jet-powered missile, shown on the cover of this week's SCIENCE NEWS LETTER, resembles a modern fighter plane. Now in full production, it can serve as a military weapon for both the Navy and the U. S. Marine Corps.

Versatility of the device permits it to be used "in various ways." This means that the Regulus can do jobs formerly requiring missiles of specialized design.

The Navy's World War II submarine Tunny already has been modified to launch the supersonic missile. The sub also has been equipped with modern snorkel "underwater breathing" tubes, a streamlined hull, conning tower and a small crew especially trained to launch and maintain the Regulus.

Department of Defense officials said the missile can strike at appropriate land targets. It also can be brought into play in amphibious combat.

Launching equipment can be installed rather quickly on "several types" of vessels. The cost is low and modification of the ship itself is held to a minimum. In addition to the Tunny, other vessels that have launched the Regulus are the seaplane tender Norton Sound, and the aircraft carrier Princeton.

Although development began in 1947, no official information was released before now. The Navy revealed that performance has surpassed the early design goals.

The Regulus currently is being built for the Navy Bureau of Aeronautics at Dallas, Texas, by the Chance Vought Aircraft Division of United Aircraft Corporation.

Meanwhile the Army has revealed its own missile capable of estimated speeds up to 1,500 miles an hour. Called the Nike, the all-weather missile has been described as "the best anti-aircraft weapon now available." It is credited with "killing" about 65% of its targets.

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MEDICINE

ACTH Production Stops When Hormone Injected

➤ THE PITUITARY glands in the head may stop producing normal amounts of its hormone, ACTH, when that hormone is injected into patients, Dr. James D. Hardy of the University of Tennessee College of Medicine finds.

Dr. Hardy learned this by trying to find ways of improving the nutritional state of patients wasted by cancer and other diseases in work supported by the American Cancer Society.

Because cortisone, adrenal gland hormone, opens body cells to certain salts contained in body fluids, Dr. Hardy wondered whether the malnourished cancer patient's glands were producing too little cortisone to enable body cells to utilize food properly. ACTH stimulates production of cortisone, so he tried injections of it. When he stopped the ACTH, however, he found that it took three days before the gland resumed production of it.

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PUBLIC HEALTH

Safety Rules for Using Insecticides

➤ HOUSEWIVES ALL over the nation are now spraying insecticides in the annual spring house cleaning and anti-moth battle.

By the time that is over, it will be time to spray for mosquitoes, flies and other spring and summer pests. Because most insecticides are poisonous, they should be used with proper precautions. These are given on the labels of insecticide containers. They are put there for your safety, so it will pay you to read and follow them.

Some common sense rules for safe insecticide use are given by Dr. L. S. Henderson, entomologist of the U. S. Department of Agriculture, as follows: Do not get the insecticide in food or on dishes, silverware, or cooking utensils. If you spill a concentrated insecticide on yourself, wash it off immediately with soap and water. Do not expose yourself unnecessarily to dust or spray mist in the air. Provide extra ventilation by opening doors and windows when extensive spraying or dusting jobs are done.

Do not spray liquid insecticides into electrical outlets or on exposed connections where you might create a short-circuit. Do not apply oil-base insecticides near fire, flame, or sparks, and do not smoke while applying them. When you have finished applying an insecticide, dispose of the unused portion or return them to the original container. Clean the sprayer or duster, then wash with soap and water. Change your clothes if you have spilled insecticide on them.

Keep insecticides where children or pets can't get to them. Do not store them with foods or where they might be mistaken for food items.

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MEDICINE

Blood '53 Anti-Polio Hope

Outlook for this year is for polio protection from gamma globulin. Vaccines must be thoroughly tested before widespread use. Production plans for one have been made.

➤ HERE IS the 1953 polio protection story: For this summer and probably next, gamma globulin from blood or a "touch of polio" infection. Later, we can now hope, a safe and effective vaccine from monkey kidneys, fertile hen's eggs or some other source.

Large pools of blood, such as those donated by Americans to the National Blood Program, contain polio-fighting antibodies in their gamma globulin fraction. This is because many of the donors, knowing it or not, have had enough polio virus get into their bodies to cause build-up of the anti-polio substance.

Trials of the G.G. during the past two summers seem to show that it can protect children from the paralytic effect of poliomyelitis. The protection is not expected to be long-lasting. The supply is limited, enough for about one million doses. Booster shots might be needed.

Many children will still have to rely on getting just a "touch of polio" as one doctor put it. It may be enough to give the child one of those little feverish upsets children so often get. Or it may not cause enough trouble to be noticed. But these little infections apparently can also cause polio antibodies to be formed. With antibody formation comes resistance to the serious attacks of the crippling or sometimes killing polio infection.

Vaccines against polio, which everyone is talking about these days, are still in the class of dreams not yet realized. To be sure, vaccines have been made and given some preliminary testing. But the men who made them and who should know say the vaccines are still a long way from being ready for practical use.

At the University of Pittsburgh, Dr. Jonas Salk and associates have made a vaccine. (See SNL, April 4, p. 211.) Blood tests of the few score who got it showed that this vaccine gave immunity equal, in terms of antibodies, to that given by an outright attack of crippling polio. It did this without causing any sickness. A few got some red skin wheals, like a hive, where the "shot" was given.

But this vaccine has not yet come through the crucial test of showing what it will do to protect against polio during an epidemic. It is not yet even ready for such a test. The vaccine was made from virus grown on monkey kidneys and killed with formalin to make it safe.

Some authorities think that a killed virus never gives as lasting protection as a live one. The live one, of course, must be "modified" to remove its disease-causing power without stopping its power to cause protecting antibody development.

This actually has been done. Dr. Herald R. Cox and associates at Lederle Laboratories, Pearl River, N. Y., have succeeded in making the polio virus grow on fertile hen's eggs. (See SNL, Oct. 25, 1952, p. 259.) This, of course, solves the supply problem, because there are plenty of eggs. Tests have been made showing that the virus is truly modified, that is, it did not cause polio, it did cause protecting antibodies to form.

But so far, Dr. Cox and associates have only been able to get one strain of one type of polio virus to grow on the fertile hen's eggs. There are three types of polio virus. All three will grow on monkey kidney and all three are included in the vaccine developed by Dr. Salk.

Dr. Cox's egg vaccine has another advantage: It can be given by mouth. This is not just a help to the child who might prefer swallowing a pill to having a needle stuck in him. It is an advantage, Dr. Cox believes, because it will follow the natural way the polio virus enters the body, through the mouth and digestive tract.

The supply problem for the Salk vaccine can be solved. Harry J. Loynd, president of Parke, Davis and Company, Detroit, says his company "will be in a position to make it available at once" when it has passed field trials for safety and effectiveness. Arrangements have already been made to get monkeys from India for the purpose. And even and $45 to $50 apiece for the monkeys, Mr. Loynd does not think the vaccine cost will be prohibitive because of the good yield of virus for vaccine from the monkey kidney tissues.

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TECHNOLOGY

Magnesium Auto Bodies Pioneered in Britain

➤ LIGHTWEIGHT AUTO bodies fabricated of magnesium may be in the offing. A radically different, 132-pound prototype of one went on display at the First International Magnesium Exposition in Washington.

R. J. Cross, managing director of Essex Aero, Ltd., England, says the magnesium body is better than plastic ones. He bases his judgment upon 15 months of experimental work. The magnesium body might be cheaper than plastic bodies in mass production.

The model displayed was designed to fit an English-make car. It is attached to the chassis at only six points.

Other items on display included lightweight vacuum cleaners, porch furniture, ladders and skis.

Magnesium is expected to become more available since a method for extracting it from sea water is now being developed. Sufficient magnesium exists in the oceans to cover the entire surface of the earth to a depth of nine feet.

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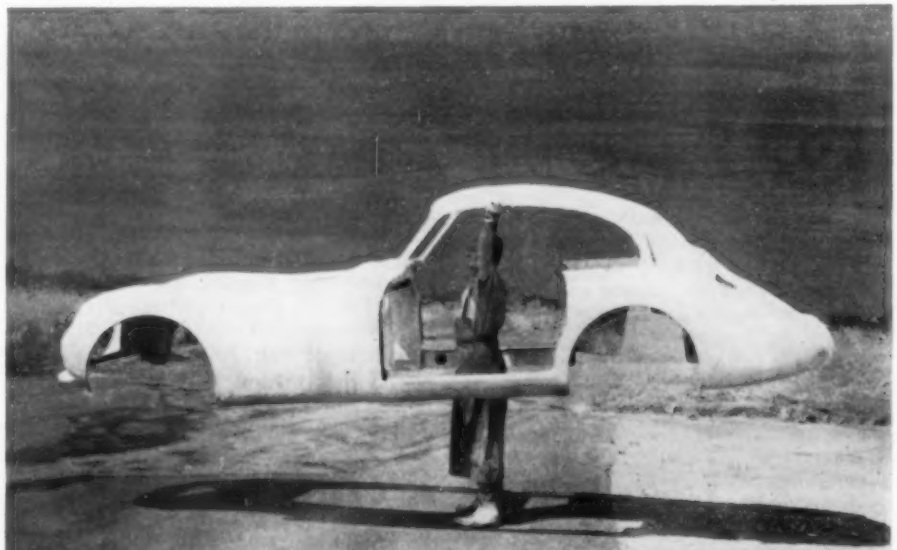


ALL-MAGNESIUM AUTO BODY—Weighing only 132 pounds, this auto body made entirely of magnesium was developed in England. It is mounted to the chassis at only six points.

RARE SEA OTTER DISPLAY—This habitat grouping of the rare sea fur animal, on display at the Chicago Natural History Museum and worth $7,500, is the first of its kind anywhere in the world.

GENERAL SCIENCE

Standards Director Fired

Question of political influence in scientific bureaus raised by removal of Dr. A. V. Astin as director of the National Bureau of Standards over battery additive report.

➤ THE FORCED resignation of Dr. A. V. Astin as director of the National Bureau of Standards raises the whole question of whether there shall be political control over the findings of this and other scientific organizations in the government.

Displeasure with a report upon an additive to storage batteries precipitated the dismissal of Dr. Astin by Secretary of Commerce Sinclair Weeks and Assistant Secretary Craig R. Sheaffer. Dr. Astin rose through the scientific ranks of the bureau after the completion of his graduate fellowship in 1930.

No Bureau of Standards director through its long history has been fired through political decision heretofore. When Dr. Astin was senior associate director of the Bureau of Standards under Dr. Condon, preceding director, he was safe from precipitate demand for his resignation. So now are the other scientific personnel, including the present ranking associate director, Dr. Wallace R. Brode, who are under Civil Service.

Bureau of Standards scientists, concerned with testing and evaluating for the government literally thousands of products and methods offered to the government, obviously cannot function if a report displeasing to someone would result in loss of jobs. Most scientists would not work under such conditions and those who would could hardly render reliable reports.

This is more important than the question of whether battery additive tests by the Bureau of Standards or the Massachusetts Institute of Technology can be reconciled or are in disagreement.

President Eisenhower has been asked by Dr. E. U. Condon, former director, to make a complete and independent investigation of the facts.

Telegraphing the President from Corning, N. Y., where he is research director of the Corning Glass Works, Dr. Condon as president of the American Association for the Advancement of Science, declared:

"Dr. Astin is an outstanding scientist and public servant of highest integrity and with a brilliant war record on proximity fuse development. He is standing for honesty and is unwilling to suppress technical facts."

Dr. Condon suggested further that the National Academy of Sciences, chartered by President Lincoln for independent scientific advisory service to the federal government, and the visiting committee of the National Bureau of Standards, established by Congress to watch over Bureau of Standards work, are both suitable bodies of high standing which could investigate for President Eisenhower the issues at stake.

These issues, Dr. Condon declared, "if not handled well will deal a crippling blow to the scientific service of the government."

The visiting committee of the Bureau of Standards was not consulted in the Astin dismissal. Its chairman, Dr. Robert F. Mehl, metallurgist of the Carnegie Institute of Technology, knew nothing about it until he read about it in the newspapers.

Recent literature on additives to storage batteries is extensive. SCIENCE NEWS LETTER carried a story on battery additives in the issue of April 21, 1951, p. 255, based on findings published as National Bureau of Standards Circular 504, Battery Additives. At one time this pamphlet was available from the government printing office for 15 cents.

This story read as follows in part:

"Various preparations advertised to put new life into worn-out or so-called 'dead' lead-acid batteries, such as used in automobiles, have little or no value, it is shown from recent tests made by the National Bureau of Standards.

"The Bureau has made extensive laboratory and field tests for the Federal Government in order to determine the practicability of these so-called additives. The tests show little or no difference between batteries treated with these mixtures and similar untreated batteries used as controls."

Secretary of Commerce Weeks stated on March 31 that he was "going to direct the withdrawal of Circular 504 and all other circulars and technical reports dealing with battery additives until such times as those (new) tests are completed." The Government Printing Office reports that the Circular was ordered withdrawn from stock on March 26.

Science News Letter, April 11, 1953

PUBLIC SAFETY

Water in Coal Mines Threatens Three Counties

➤ THE ECONOMIC future of three Pennsylvania counties that produce anthracite coal now is "seriously threatened" by dammed up water in abandoned mines.

The U. S. Bureau of Mines reports that blocks of coal are left intact between abandoned and producing mines. The blocks act as barriers. They keep water that collects in abandoned mines from flooding active mines unexpectedly.

But a Bureau study of Pennsylvania's anthracite region turned up the fact that many of these barriers are in "doubtful condition." They may give way at any moment, possibly causing miners in adjacent mines to drown.

The threatened counties listed by the Bureau were Schuylkill, Columbia and Northumberland.

Science News Letter, April 11, 1953

GENETICS

Atom Smasher Aimed at Tiny Heredity Bearers

➤ A TWO-MILLION-VOLT atom smasher has had its beam pin-pointed to such fine dimensions that it can strike just one or a very few of the microscopic carriers of heredity in the living cell.

Which part of the cell is most affected by radiation from atom bombs or other sources will be more precisely determined from these experiments, is the hope of scientists doing this work.

Results so far were reported by Dr. William Bloom and Prof. Raymond E. Zirkle of the University of Chicago at the meeting of the American Association of Anatomists in Columbus, Ohio.

The beam itself consists of nuclear particles called protons that are allowed to pass through a "super-pinhole" in a sheet of metal that reduces the beam to one twelve-thousandth of an inch in diameter.

When the beam is directed against only two or three of chromosomes in dividing cell, the irradiated chromosomes act as if glued together. The non-irradiated ones, instead of moving straight apart in the normal way, turn about the glued ones as if they were a hinge.

In some cases a chromosome bridge was left between two new daughter cells, and the nuclei squirted back and forth between the newly formed cells.

Different dosages of radiation caused different upsets in the process of cell division.

Science News Letter, April 11, 1953

PHYSICS

Soviet Influence Mines Can Menace U. S. Ships

➤ NEW METHODS of setting off naval mines on the approach of a ship are hinted at in the Army's Command and General Staff College *Military Review* (April).

These hints were coupled with a warning about the present Soviet awareness of both the potentialities and capabilities of mine warfare. Russia is building two fast minelaying submarines and has three more minelaying ships and 22 more minesweepers than has the United States.

Three kinds of "influence" mines, those which do not have to come into direct contact with the ship to explode, were used during World War II. These are magnetic, acoustic and pressure mines. They depend for operation on physical characteristics possessed in common by most ships.

"It requires a minimum of technical knowledge to realize that there are various other methods which might be used for the actuation of an influence type mine," Col. Paul L. Bates says. "National security precludes reference to this subject in detail."

Other physical characteristics possessed by most ships include the sending forth of heat waves and the cutting off of light waves from the sky in the sea directly under and around them. These two could be utilized to set off influence type mines.

Pointing out that large areas of our coastal waters are ideal for the sowing of mines, Col. Bates says, "Faced with an aggressor having a large number of submarines, a sizable bomber force and an effective fifth column, the use of mines offers a near paralyzing capability."

The minesweeping capabilities of this country, he says, are "completely inadequate" when the length of the coast lines, the canals, and the rivers and harbors are considered.

Science News Letter, April 11, 1953

INVENTION

Plastic Helicopter Blades Invented

➤ HELICOPTERS WITH plastic rotor blades may soon be flying through the air with the greatest of ease as the result of an invention recently patented.

The patent, number 2,630,868, on a plastic rotor blade was granted to Francis R. Ellenberger, Cedar Grove, N. J., and assigned to the General Electric Company.

Mr. Ellenberger points out that the ordinary type of rotor blade has a longitudinal spar, sometimes used in combination with transverse ribs. His blade, shaped from a cellular plastic material, eliminates the expense and difficulties involved in building a rotor blade, requires less skill manufacturing and has more strength.

His blade carries nearly all the stresses on the outer skin, which is filled with a relatively weak cellular plastic material. This keeps the skin from collapsing and maintains the correct cross-sectional contour.

The plastic blades are formed by extrusion, molding or machining a piece of cellular cellulose material into a section of the desired airfoil shape, wrapping it with cloth impregnated with phenolic compound, clamping it in a mold and curing in an autoclave.

Science News Letter, April 11, 1953

AGRICULTURE

Predict Rice Production Will Top All Records

➤ WORLD RICE production will smash all records in 1952-53 (August-July), predicts the U. S. Department of Agriculture. This means more food for millions of hungry mouths.

The department's Office of Foreign Agriculture Relations estimates a world-wide yield of 357,000,000,000 pounds of rough rice for 1952-53, four percent above the previous record of 342,000,000,000 pounds in 1948-49 and seven percent greater than the pre-war average.

The greatest gain in rice production this year was seen in Asia, up six percent from last year. India planted one of its largest acreages of rice, and good weather has helped in higher yields.

Science News Letter, April 11, 1953

IN SCIENCE

VETERINARY MEDICINE

Stepping on Old Nail Endangers Livestock Too

➤ STEPPING ON an old nail carries just as serious a threat of lockjaw, or tetanus, to livestock as to humans, the American Veterinary Medical Association warns. Farmers should have regular barnyard clean-up campaigns to get rid of old nails, pieces of wire and other objects that can cause dangerous puncture wounds in which tetanus germs thrive.

Attempts at home medication or surgery on animals, if proper sanitary measures are not taken, may also result in tetanus infection, the association warns.

The tetanus germs live and multiply in the soil.

Dogs apparently are immune to the infection and cattle are relatively immune. Horses, swine and sheep, however, have no such protection.

Science News Letter, April 11, 1953

MEDICINE

Radiogold Fights Prostate Cancer

➤ CANCER OF the prostate gland, a leading killer of men, now is being fought with radioactive gold. About half of 160 patients given this treatment within the past 20 months are still free of symptoms.

Whether they have been cured will not be known for another three years or so. One-fifth of the men have died in spite of the treatment, and about a third are still alive but with obvious cancer. These results were announced by the American Cancer Society which supported the research leading to this use of radioactive gold.

The method of using it for cancer of the prostate was developed by Drs. R. H. Flocks, H. Dabney Kerr, H. B. Elkins and David Culp of the State University of Iowa.

The radioactive gold in colloidal form is mixed with hyaluronidase and the adrenal gland hormone, epinephrin, or adrenalin.

The hyaluronidase is a body chemical sometimes called the "spreading factor" because it makes substances spread through tissues. This makes the radioactive gold spread through the gland where it is injected and into surrounding tissues that have been invaded by the cancer.

The epinephrin causes blood vessels to contract and is used to check in this way the spread of the radioactive chemical to normal tissues.

The radiation from the gold destroys the cancer. The short penetrating distance of most of this radiation, however, makes it relatively sparing of adjacent normal tissue.

Science News Letter, April 11, 1953

NCE FIELDS

PHYSICS

Electron Synchrotron Starts Work This Spring

➤ NEW LIGHT on how the atom is put together is expected from operation at Cornell University, Ithaca, N. Y., of what is believed to be the most powerful electron synchrotron in existence.

Scientists are scheduled to begin this spring shooting a beam of electrons with energies up to one billion electron volts at a target, releasing great quantities of gamma rays for experiments probing the atom's structure.

In synchrotrons, electrons, traveling at relatively low velocities in a chamber from which nearly all the air has been pumped out, are given a carefully timed "kick" which accelerates them to much higher energies. The new "supersynchrotron" was designed by Dr. Robert R. Wilson, director of the Cornell Laboratory of Nuclear Studies, and is being built with Office of Naval Research funds.

The usual method of electromagnetic focusing may be replaced by the "strong focusing" system, recently developed at Brookhaven National Laboratory, that cuts down considerably on the magnet weight required to get a given energy level.

Science News Letter, April 11, 1953

ENGINEERING

Pump Heats and Cools in Season

➤ YEAR-ROUND AIR conditioning has worked well in three houses using experimental air-to-air heat pumps, the American Power Conference in Chicago was told.

Gerald L. Biehn, Westinghouse design engineer, reported that houses in Lynchburg, Va., Miami, Fla., and Fort Worth, Tex., all turned in good records in recent tests.

The tests were designed to prove the worth of an experimental heat pump system. In moderate climates, air-to-air heat pumps may become as popular as coal or oil furnaces.

Air-to-air heat pumps cool houses in the summer, expelling the household heat into the outside air. In the winter the cycle is reversed. Even though the outside temperature may be a little below freezing, the devices still can extract enough heat from the outside air to warm houses comfortably.

Although it may not feel that way, plenty of heat remains in 30-degree air. It is this heat that the device pumps into the house.

Owners of the test houses pronounced this heating aspect "satisfactory." One owner said he thought it was even better than other hot-air systems. It produced no drafts and, though the air was warm, it was not dry, he said.

At local power rates, it cost about $30 a month to run the five-horsepower unit at Lynchburg. Due to higher power rates and a different climate, it cost a little less than $40 to run the same size unit in Fort Worth. The Miami unit, only three horsepower, cost $10 a month to operate.

Engineers hope to cut these costs through equipment improvements and by insulating the houses better.

Science News Letter, April 11, 1953

HERPETOLOGY

Rattlesnakes Can Take Only 20 Minutes of Sun

➤ RATTLESNAKES ARE often associated with the hot summer sun of the desert, but on a balmy day of 85 degrees with a breeze blowing, a rattler becomes helpless if it stays in the sun more than 20 minutes.

Dr. Raymond B. Cowles, University of California at Los Angeles zoologist, reports this fact in connection with a special investigation of rattlesnakes under a $15,000 grant from the Richfield Corporation.

The rattlesnake has a very limited temperature range at which it can operate. Below 50 degrees, the snake is torpid and prefers to lie motionless in a hole. Above 90 degrees, it becomes uncomfortable and may die unless it can find shade and cool off. Dr. Cowles points out, however, that temperatures at a snake's level may be higher than at a human being's shoulder level.

It is up to the rattler to maintain his own body temperature by alternating between sun and shade, Dr. Cowles points out. Thus, if the snake becomes too cool in the shade, it may bask in the sun for a while. Often a rattler lies coiled under a bush with just enough of his body exposed to the sun to keep a fairly constant temperature.

Science News Letter, April 11, 1953

INVENTION

Low Cost Planetarium For Schools Patented

➤ A RELATIVELY low-cost planetarium which can be economically used in schools or even in the home to teach or demonstrate astronomical phenomena has been invented by Armand N. Spitz, Lansdowne, Pa. Mr. Spitz points out that the planetariums now in operation in connection with museums are highly complicated and quite expensive because of the high degree of optical precision employed.

He gets around this by projecting his stars on the dome merely in the form of the projection through pinholes of various sizes of the images of concentrated filament lamps. For the usual necessities of teaching or demonstration, this is quite adequate, Mr. Spitz says.

His patent number is 2,632,359.

Science News Letter, April 11, 1953

BIOCHEMISTRY

Liver-Function Test Is Faster, More Accurate

➤ THREE TIMES as fast and more accurate than present techniques, a new test to measure how well the liver is functioning has been devised by two University of California at Los Angeles Medical School doctors.

A modification of a clinical test used since 1925, the new test is the result of research by Drs. Raymond D. Goodman and Alvin E. Lewis at the West Los Angeles Veterans Administration Center.

It measures how rapidly the liver can remove an intravenously injected dye, bromsulfalein, from the blood within a 15-minute period. Three small blood samples are taken from the individual during this period. The samples are then analyzed in a spectrophotometer. From these data the rate of dye removal by the liver can be calculated.

The new test is an improvement over older techniques because it only requires one-third the time. This eliminates possibility of dye absorption in the small intestine, a source of error in previous tests. It also makes a direct measurement of the blood volume, a factor in the computation of dye removal. Previous methods used an average value for the tested individual's blood volume based upon his weight.

More than 100 patients having known diseases of the liver as well as those having normal livers have been studied with the new technique. In all cases differences in rate of dye removal from the blood between normal and diseased livers were clearly indicated by the new test.

Science News Letter, April 11, 1953

PHYSICS

Water-Finding Gadget Outclasses Forked Stick

➤ THE WILLOW limb divining rod of legend and literature has a modern successor: an electromagnetic device that not only locates water but also indicates its quality.

The new "divining rod" is an application of electromagnetic techniques used in ore prospecting. It was developed by Don Hansen of the Institute of Geophysics at the University of California at Los Angeles.

The technique, designed to locate underground water sources in the water table region, has proved accurate in preliminary tests. It uses two wire coils to locate water-bearing strata. One coil induces an electric current into the ground. The other measures differences in the induced current as it flows through the ground.

Water-bearing strata, such as tightly packed silt and clay or loose sand and gravel, are identified by their degree of conductivity of the electric current. The conductivity pattern also reveals geological formations such as buried river channels.

Science News Letter, April 11, 1953

HORTICULTURE

Chemistry Aids Garden Soil

Chemical soil conditioners promise better soil structure for problem gardens. They work like organic matter to keep cloddy soils light and porous for good plant growth.

By HORACE LOFTIN

➤ THE PHYSICAL condition of your garden soil can spell success or failure for your efforts to grow healthy, productive plants this spring. Hard-packed soils through which water and air cannot properly circulate are not likely to produce thriving plants.

So let us look at a shovelful of your own soil. Light loam or sandy soils will not need as much attention as heavier silt loam or clay soils. Roll some between your fingers. Is it crumbly, or cloddy? Crumbly soil is an indication of good soil structure, or "tilth."

Now make a mud pie. Mix some of your soil with water and note whether the resulting "pie" turns into a gooey, dense mass or whether the soil stays in small clusters that tend to crumble apart.

The crumbly "pie" denotes good tilth again. If your garden has poor structure, you can picture to yourself the condition of your garden beneath the surface after a hard rain.

There are two general methods of correcting poor soil structure. One is as old as agriculture itself; the other represents the latest advance of industrial chemistry. The first is to add organic matter to the soil; the second, to use one of the brand new chemical soil conditioners.

Products Differ Widely

Good soil structure comes about when the soil particles are bound together in small, crumbly and more or less distinct lumps, or aggregates. These aggregates result in a loose, porous soil through which air and water can freely circulate and roots can easily force themselves.

Chemical soil conditioners, then, are substances added to well-worked soil to bind together these small aggregates. Generally, these soil conditioners are of the nature of synthetic resins, a sort of chemical rubber band, which hold the particles of soil together.

Tests by the U. S. Department of Agriculture on 28 different commercial soil conditioners have shown wide differences in effectiveness of the different products. However, nearly all of them show a beneficial effect on the general condition of soil structure when properly applied. But they can be worthless, or even harmful, if improperly used.

Another point brought out by the Agriculture Department scientists: there is no evidence that soil conditioners can form aggregates by themselves. They seem merely to preserve a condition that already exists. What this means to you is that you must work your soil, to which you have added the right amount of conditioner, into a loose, porous state. The presence of soil conditioner then insures that the soil will maintain that healthy condition.

Many different chemical compounds have appeared on the market as soil conditioners. The five principal chemical groups used, however, are acrylates, polyacrylates, polyacrylonitrile compounds, maleic acid derivatives and silicates.

How much soil conditioner should you use? Dr. M. S. Anderson, soil specialist of the Department of Agriculture, recommends the following as a general, though not hard-and-fast, rule:

With soil conditioners containing 100% active ingredient, use one pound for each 25 square feet of garden when you work the soil to a depth of six inches; one pound per 50 square feet, to a depth of three inches; and one pound per 150 to 400 square feet when sprinkled on the surface for temporary effect.

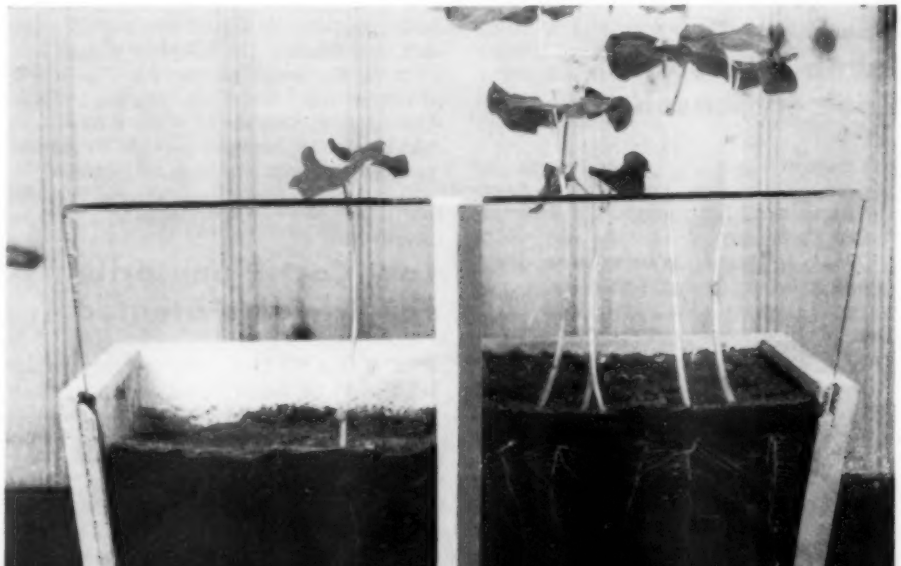
Concentration of active ingredients in soil conditioners varies according to the brand. So, when you choose a soil conditioner, always check the percentage of active ingredient to compare price and usefulness. The amounts recommended above are on a basis of 100% active ingredient. If your conditioner contains less than this amount, you should increase the amount used proportionately.

In terms of soil conditioner to soil weight, use of these recommended quantities results in a one-tenth of one percent mixture of conditioner in the soil. Lesser concentrations of conditioner to soil may be ineffective, while concentrations above two-tenths of one percent can be toxic to your plants. Insufficient mixing of conditioner in the soil can adversely affect plants, too.

No Nutritive Value

Before you buy a soil conditioner, remember that it has no nutritive value for plants. You will still have to add fertilizers to your garden.

Adding organic matter, such as old leaves and stems, to your garden is another way of obtaining good soil structure. Chemically, the breakdown of organic matter in the soil results in the creation of natural resins which work similarly to soil conditioners to bind soil particles into aggregates.



EFFECT OF CONDITIONERS—Roots push through the light porous soil containing conditioner (right) and yield flourishing plants. Same soil without conditioner is tightly packed, retarding good growth.

Physically, the mere presence of the large pieces of organic matter helps to keep the soil porous.

Organic matter does contain mineral nutrients necessary for plant growth, differing from the chemical soil conditioners. And when it is broken down by bacterial action in the presence of nitrogen, it adds to the supply of soil humus in your garden.

On the debit side, pound-wise it takes much more organic matter to do a job on soil structure similar to the soil conditioners. And because of bacterial decomposition of the natural resins, organic matter must be added regularly to preserve soil structure.

Advice on Fertilizers

Concerning fertilizers for your soil, you will have to use them if you expect to get the best results from your garden. Organic material alone is not enough. For general gardening purposes, the best fertilizer formula you can use is an old favorite, 5-10-5. One to two pounds per 100 square feet is often a suitable rate of application. The first figure in a fertilizer formula indicates the percentage of nitrogen present; the second, available phosphoric acid; and the third, potash.

Commercially prepared liquid fertilizers have recently become popular on the market. But Dr. Anderson suggests that there is no especial advantage in buying fertilizer in liquid form for gardening purposes. If for some reason you want liquid fertilizer, just add your 5-10-5 to an appropriate amount of water and shake well before using. That is the secret of liquid fertilizers.

Highly concentrated fertilizers for dilution with water by the consumer, and properly labeled as such, are often useful because of the convenience of putting a lot of fertilizing material in a small package. These are mostly for use with house plants.

Besides the nutrients and minerals used in large quantities by growing plants, there is a group of minerals called the "trace elements" which must be present in the soil, though in very minute amounts, to insure proper plant growth.

The most important trace elements for plants are iron, boron, manganese, copper, zinc, selenium and molybdenum.

A new class of commercially prepared chemical mixtures has come into existence to supply trace elements in deficient soils These substances release trace elements by dissolving very slowly in the soil water. This insures a constant supply of trace elements while preventing too high a concentration of them free in the soil at any one time.

Now you have a well-fertilized soil of good tilth. It's time to plant your seeds.

Science News Letter, April 11, 1953

ELECTRONICS

Transistors of Al, Ga, In

➤ THE REVOLUTIONARY transistor itself may soon be revolutionized. Newly-developed, low-cost materials, revealed for the first time at the American Physical Society meeting in Durham, N. C., may do it. The materials have electrical properties similar to the expensive germanium now used in transistors.

Transistors are the most likely devices to replace fragile vacuum tubes in radios, television sets, hearing aids and giant electronic computers. They are pea-sized chunks of germanium that can be harnessed to amplify radio signals with practically no power consumption. They are lightweight, long-lived, rugged and small. These qualities are all much sought after by manufacturers of electronic equipment, particularly those who make military equipment.

The new materials are compounds of aluminum, gallium and indium with arsenic and antimony. They are now being tested by scientists at Battelle Memorial Institute, Columbus, Ohio, at Bell Telephone Laboratories and at the National Bureau of Standards. They have already been successfully used to change small amounts of alternating current into direct current. To the various scientists working on the new compounds at these three laboratories, this means that the material may be suitable for transistors.

Costwise, the compounds are less expensive than hard-to-get germanium. Both aluminum and antimony, for example, sell for less than 50 cents a pound. Germanium costs $350 a pound.

Scientists speculate that the aluminum-antimony compound may even be better than germanium where high operating temperatures are met. Such conditions often appear in military equipment.

Science News Letter, April 11, 1953

AERONAUTICS

Flying Repair Shop Fixes Plane Gunsights in Korea

➤ A FLYING repair shop now is being used in Korea to fix electronic gun sights on the Air Force's F-84 Thunderjet and F-86 Saberjet fighters.

The shop, a specially equipped trailer that can be hauled in transport planes, was designed and built at Wright-Patterson Air Force Base, Dayton, Ohio, in less than 30 days. It is designed to give on-the-spot emergency repairs to radar-controlled gun sights that otherwise would have to be shipped elsewhere for fixing, a costly and time-consuming process.

Manned by a team of specialists, the trailer is to augment regular maintenance shops in the field. It will be available anywhere in the combat zone on an emergency-call basis.

Science News Letter, April 11, 1953

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AMERICAN LIFE: Dream and Reality—W. Lloyd Warner—*University of Chicago Press,* 268 p., $3.75. Describes, analyzes and interprets some of the important aspects of the social life of this nation.

ANALYTIC GEOMETRY AND CALCULUS—Lloyd L. Smail—*Appleton-Century-Crofts,* 714 p., $5.50. Suitable both for liberal arts students and for students of engineering and science.

ANTHROPOLOGICAL PAPERS, Nos. 33-42—Bureau of American Ethnology, Smithsonian Institution—*Government Printing Office,* Bul. 151, 507 p., illus., paper, $1.75. Papers on the Crow Nation, "Aboriginal Fish Poisons," "The Wind River Shoshane Sun Dance," etc.

BASIC DRUGS: U. S. Public Health Service Hospitals and Clinics, 1953—Public Health Service—*Government Printing Office,* 165 p., paper, 50 cents. A handbook of drug therapy stressing uniform drug nomenclature.

BOBBY BLUEGILL—R. W. Eschmeyer—*Fisherman,* 47 p., illus., paper, 50 cents, cloth $1.50. Points out to children the need for using our soil and water wisely.

BRIGHT CHILDREN: A Guide for Parents—Norma E. Cutts and Nicholas Moseley—*Putnam,* 238 p., $3.50. Deals with the special problems of parents in coping with bright children.

CAREER MISS: Young Women's Guide to Job Opportunity, 1953 New York Edition—Stanley E. Kreimer and Daniel S. Pickrell, Jr.—*Career Publications,* 58 p., illus., paper, $1.00. An introduction to 67 top New York concerns, their working environments and career opportunities.

CHARLEY COTTONTAIL—R. W. Eschmeyer—*Fisherman,* 50 p., illus., paper, 50 cents, cloth $1.50. An educational story about rabbits and how they are managed for a better hunting future.

CHEMICAL PROCESSING OF WOOD—Alfred J. Stamm and Elwin E. Harris—*Chemical Publishing,* 595 p., illus., $12.00. Information on the chemical utilization of woods, especially of wood residues and inferior species of wood.

CIVIL AIR REGULATIONS AND REFERENCE GUIDE FOR A & E MECHANICS—*Aero Publishers,* rev. ed., 120 p., paper, $2.00. Information for students working for their aviation mechanics license.

DISTRIBUTION OF LOAD STRESSES IN HIGHWAY BRIDGES—*Highway Research Board,* Research Report 14-B, 86 p., illus., paper, $1.50. Papers presented at the 31st annual meeting, Jan., 1952.

ELEMENTS OF PROPELLER AND HELICOPTER AERODYNAMICS—Daniel O. Dommasch—*Pitman,* 178 p., illus., $4.50. The fundamental principles of helicopter theory presented for use as a text in undergraduate college courses.

THE FLORA OF PONAPE—Sidney F. Glassman—*Bernice P. Bishop Museum,* Bulletin 209, 152 p., illus., paper, $2.50. Report of an expedition in 1949, in which almost 500 varieties of plants were collected.

A GUIDE TO BIRD WATCHING—Joseph J. Hickey—*Garden City,* 264 p., illus., $1.98. Facts to aid the amateur in bird study.

JUVENILE DELINQUENCY: Causes, Prevention, Treatment—An Annotated Bibliography—Federal Security Agency Library—*Social Security Administration, Children's Bureau,* 41 p., paper, free upon request to publisher, Third and Independence Ave., S.W., Washington 25, D. C. A selective rather than comprehensive bibliography, with emphasis on current material.

THE MEANING OF RELATIVITY—Albert Einstein—*Princeton,* 4th ed., 165 p., $3.50. A revision of Einstein's generalized theory of gravitation unifying previous conflicts and completely describing the physical universe in a single theory. (See SNL, p. 227.)

THE MECHANISM OF DUST CLEARANCE FROM THE LUNG—Paul Gross—*Mellon Institute of Industrial Research,* 5 p., paper, free upon request direct to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

AN OTTER'S STORY—Emil E. Liers—*Viking Press,* 191 p., illus., $2.50. A true story as well as a defense of the otter, with a plea for the animal's protection.

PERON'S ARGENTINA—George I. Blanksten—*University of Chicago Press,* 478 p., $6.50. A survey of the contemporary Argentine political scene.

PRINCIPLES AND PRACTICES OF SECONDARY SCHOOL TEACHING—Herbert J. Klausmeier—*Harper,* 521 p., $4.50. Aids the teacher in improving her classroom technique.

THE QUMRAN (DEAD SEA) SCROLLS AND PALAEOGRAPHY—Solomon A. Birnbaum—*American Schools of Oriental Research,* Supplementary Studies Nos. 13-14, 52 p., illus., paper, $1.50. Discusses the age of the Dead Sea Scrolls.

ROCKET PROPULSION: With an Introduction to the Idea of Interplanetary Travel—Eric Burgess—*Chapman & Hall* (Macmillan), 235 p., illus., $4.50. Both an introduction for the layman and a reference guide for the specialist.

SCIENTIFIC LEADERSHIP IN SMOKE CONTROL—Robert T. Griebling—*Mellon Institute of Industrial Research,* 2 p., paper, free upon request to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

SPONGES OF THE ALASKAN ARCTIC—M. W. De Laubenfels—*Smithsonian Institution,* Misc. Collections, Vol. 121, No. 6, 22 p., illus., paper, 30 cents.

STRUCTURE AND FUNCTION OF THE GENITALIA IN SOME AMERICAN AGELENID SPIDERS—Robert L. Gering—*Smithsonian Institution,* Misc. Collections, Vol. 121, No. 4, 84 p., illus., paper, 80 cents.

TELEVISION AND RADAR ENCYCLOPEDIA—W. MacLanachan, Ed.—*Pitman,* 216 p., illus., $6.00. An up-to-date guide to the principles, practice and terminology of television and radar.

TV MANUFACTURERS' RECEIVER TROUBLE CURES, Vol. II—Milton S. Snitzer, Ed.—*Rider,* 117 p., illus., paper, $1.80. The makers provide hints on how to make their television sets work better. Covering models from Emerson to Jackson.

TEXTBOOK OF BOTANY—Edgar N. Transeau, Homer C. Sampson and Lewis H. Tiffany—*Harper,* rev. ed., 817 p., illus., $6.00. A text designed to give the students facts and procedures which they will retain and use throughout their lives.

THOMAS ALVA EDISON, INVENTOR—Ruth C. Weir—*Abingdon-Cokesbury,* 128 p., illus., $1.50. Incidents from his boyhood and young manhood. For ages 7 to 11.

WATER, WATER EVERYWHERE—Mary Walsh—*Abingdon-Cokesbury,* 48 p., illus., $2.00. Covers the aspects and actions of oceans, rivers, etc., and tells of the effects of rain and snow.

WAYS TO PSYCHIC HEALTH: Brief Therapy from the Practice of a Psychiatrist—Alphonse Maeder, translated by Theodore Lit—*Scribner,* 200 p., $3.50. Presents 15 case histories, and portrays the interaction between medical psychotherapy and pastoral care.

Science News Letter, April 11, 1953

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ASTRONOMY

Largest Minor Planet To Be Hidden by Moon

➤ THE LARGEST minor planet, Ceres, with a diameter of about 480 miles, will be hidden by the moon on the evening of Friday, April 17.

The unusual event, called an occultation by astronomers, can be viewed with a pair of binoculars, though not with the naked eye, over the entire eastern half of the United States and Canada.

The minor planet's passage behind the dark side of the four-day-old moon may give astronomers a more accurate idea of its diameter. The asteroid, which will then be of magnitude 8.5, will disappear gradually, not instantaneously, starting at 7:34 p.m., C. S. T., in Illinois, and at 8:48 p.m. E.S.T. in Massachusetts.

The occultation can be seen wherever the sun has set and the sky has become dark enough for the asteroid to be visible near the moon in the western sky. The sun will still be above the horizon in the Far West at the time of occultation.

Science News Letter, April 11, 1953

PHENOLOGY

NATURE RAMBLINGS

You and Phenology

➤ IF YOU have ever taken note of the date on which the first robin appeared in your neighborhood, or the first pussy-willows or skunk-cabbages appeared, you have been a phenologist.

Phenology is one of the most fascinating of the open-air sciences. It consists essentially in the systematic observation of the dates on which things happen: the first robin, the first violet, the first oak leaves, the first mosquito.

It can go on all season: the first corn tassel, the first goldenrod, the first wild aster. As the year grows older, last things become worth noting: the last gentian, the last flight of wild ducks, the last housefly.

The word phenology comes from a Greek root meaning to disclose, to make visible or manifest. It is related to the common word, phenomenon, and to the post-Christmas feast of the Epiphany. (Incidentally, watch typists and printers who meet the word for the first time, lest they slip in a falsifying "r": phenology has no more to do with phrenology than entomology has to do with etymology.)

Phenology is a practically useful science as well as a fascinating hobby. Its pragmatic value is well demonstrated by its antiquity. Farmers' and woodsmen's lore is largely rough-and-ready phenology; Virgil's Georgics is an early textbook on the subject.

The Bible is full of phenology, especially the New Testament parables: "Now learn a parable of the fig tree: When his branch is yet tender, and putteth forth leaves, ye know that summer is nigh."

Your own phenological notebook can be as full or as simple as suits your own convenience. The important thing is to make it a year-to-year undertaking. Down one side list all the birds, flowers, trees and so on that you intend to watch, for first appearance, first nest, first eggs, first fledglings, first flowers, first leaves, first fruits, first signs of ripening, etc. Rule columns for each year, from 1953 until you are so old your eyes won't serve you any more, or your legs carry you afield.

Especially worth-while kinds of phenological observations are those that are made on the same individual organism, if it is one that stays put. Trees are especially well suited to this kind of check-up, being both long-lived and firmly anchored.

If you have a favorite elm or maple in your front yard, a pet apple or cherry tree on your lot, a familiar dogwood or hickory in the woods, it will become a better, more intimate neighbor than ever if you make a habit of asking it from time to time, "How are you feeling this spring? How did you come through the winter? Are all the little apples growing nicely?"

There can be a lot of fun in phenology.

Science News Letter, April 11, 1953

SURGERY

Adrenal Extracts Save From Surgical Shock

➤ PATIENTS IN danger of death from surgical shock, either on the operating table or some hours later, can be saved in many instances by extracts from the adrenal glands besides the epinephrine, or adrenalin, commonly used, Dr. Mark Hayes of Yale University School of Medicine, New Haven, Conn., reported at a meeting of the American College of Surgeons in Los Angeles.

Cortisone, one of the adrenal gland hormones, can help but is not enough by itself because it takes too long to act—six to 24 hours.

A close check during the operation on a blood count for acid-staining white cells as well as on the patient's blood pressure will warn the surgeon when the adrenal extracts are needed. An increase in the acid-staining white cells accompanied by a drop in blood pressure shows that the adrenal glands are inadequate to cope with the strain of the operation, and that the patient must have more adrenal hormones to survive.

Dr. Hayes reported extensive operations during which shock occurred three and four times. Each time it was overcome by prompt injection of adrenal hormones.

If before the operation there are signs that the patient will suffer shock, Dr. Hayes gives cortisone and the adrenal-stimulating pituitary hormone, ACTH, hours in advance to build up a reservoir of the hormones the patient will need during the operation.

Science News Letter, April 11, 1953

BIOCHEMISTRY

Metal in Kidney Startles

➤ THE "MOST startling discovery" of high concentrations of the poisonous metal, cadmium, in normal human kidney tissues was announced by Drs. Isabel H. Tipton, W. D. Foland, Franklin C. Bobb and W. C McCorkle of the University of Tennessee at the meeting of the American Physical Society in Durham, N. C.

Cadmium is considered poisonous if it is taken in food. Further apparent danger from it in the body lies in the fact that it has a high capture cross section for slow neutrons with resulting gamma radiation, such as that from radium or atomic bombs.

The Tennessee scientists found more than 1,000 parts per million of cadmium in every kidney specimen examined. The finding was made in spectrographic analysis of normal human tissue for trace elements. This work is being supported by the health physics division of Oak Ridge National Laboratory. The resulting information is used in calculating maximum permissible concentrations of radioactive isotopes that can be swallowed or inhaled without injury from ionizing radiations.

Cadmium was also found in lesser quantities in most samples of liver and pancreas. But 10 to 50 times as much was found in all samples of kidney tissue.

So far as Dr. Tipton and associates know, cadmium has never been assigned any role in body chemistry. It has been detected in human tissue before but has not previously been measured.

The kidney and other tissue specimens they examined came from 42 individuals from Boston; Columbus, Ohio; Memphis, and Birmingham, Ala.

Science News Letter, April 11, 1953

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Questions

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HERPETOLOGY—How much sun can rattlesnakes take? p. 233.

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Photographs: Cover, U. S. Navy; p. 227, Princeton University Press; p. 229, Bell Aircraft Corporation; p. 230, International Magnesium Exposition; p. 231, Chicago Natural History Museum; p. 234, Monsanto Chemical Co.; p. 239, Hal Campbell Photos; p. 240, Eat-Neet Co.

MEDICINE

Check for Blood Clots

➤ "HOW ARE your legs today?" This could be a lifesaving question if asked routinely every day of adult hospital patients, Dr. Meyer Naide of the Women's Medical College, Philadelphia, declared at the meeting of the American Academy of General Practice in St. Louis.

The question would help pick up blood clots while they are still in the legs instead of after the patient "suddenly drops dead of pulmonary embolism," he stated.

"Runaway blood clots," medically termed emboli, kill 30,000 persons annually. Dr. Naide called this a "grave problem when the figure is compared with the 40,000 people who die in automobile accidents in this country annually."

Factors responsible for blood clots in the veins of the legs cannot be entirely prevented, he said. In practically all patients operated on or having babies, the blood clots more after, than before, the operation or delivery. The anxiety associated with an operation or having a baby may be enough to make the blood clot more rapidly.

Inactivity of the patient is an important factor, but getting the patient out of bed early, even the same day as the operation or delivery, has not solved the problem. One reason is that patients are never as active as normal people, even when they do get out of bed early.

Moving may cause pain in the operation wound. The patients cannot "ambulate," or be out of bed walking around, at night. Sedatives and drugs to ease pain make them lie still for longer periods than normal. This slows the blood flow and gives more chance for clots to form.

Dr. Naide told the doctors to watch for these early signs of blood clots in the veins:

1. Firmness on gentle palpation of the calf of the leg.
2. Tenderness of the calf.
3. Tenderness along the inner thigh.
4. Discomfort in the calf on drawing up the foot.
5. Swelling of the calf.
6. Slight elevation of the temperature.
7. A sudden or sharp pain in the chest and cough.

Science News Letter, April 11, 1953

TECHNOLOGY

Synthetic Oil for Jets

➤ A SYNTHETIC oil has been developed to keep gears turning smoothly in tomorrow's higher-climbing, faster-flying supersonic jet aircraft.

Air Force officials said that the new oil is the first synthetic to meet military specifications for "lubricants of the future."

Using an ester base obtained from an unnamed alcohol-acid combination, the synthetic breaks some of the bonds now shackling jet aircraft designers. It works over a wider temperature range without becoming too sluggish to lubricate the small whizzing gears inside jet engines. It does not boil as soon as petroleum oils. It does not break down as easily into chemicals that will jam the engine works.

This lets designers create fighter airplanes that can fly higher and faster, and that can zoom through the skies in quick, tactical maneuvers. It also lets the engineers design the plane to work as well in the Arctic's minus 65 degrees as in the tropic's sultry 100.

Developed jointly by Standard Oil scientists in Linden, N. J., and in England, the oil was acclaimed by Air Force officials as the first successful "lubricant of the future." They pointed out, however, that other companies are working on similar synthetics and that some of them are about ready.

Synthetic oils are needed in modern jet aircraft because petroleum oils break down in the "furnace" in which they must work. Temperatures inside the engine near the jet's fuel burners may climb to more than 600 degrees Fahrenheit. Under these temperatures and in thin atmospheres, petroleum oils boil away violently. They also break down into chemical products that can ruin the engine.

The new synthetic works satisfactorily from minus 65 to a secret temperature in excess of 450 degrees Fahrenheit.

Although the synthetic costs about $9 a gallon to make, compared to the 40 cents a gallon price for regular oil, future planes will need only a few gallons each. It is believed that mass manufacture of the lubricant will lower the price.

The synthetic now is being used in tests in the United States and in Europe.

Science News Letter, April 11, 1953

ASTRONOMY

Mars Surface From —50 to +70 Degrees

➤ COMPLETION OF the calculations on 2,000 measurements of the surface temperature of the planet Mars shows that the mean range there is between minus 50 and plus 70 degrees Fahrenheit.

This was learned by U. S. Weather Bureau scientists who heard Frank A. Gifford, Jr., tell of his work in translating measurements of the energy radiated by Mars into measurements of the surface temperature. The energy measurements were begun in 1924 by Dr. W. W. Coblentz, now retired from the National Bureau of Standards, and the late C. O. Lampland of Lowell Observatory, Arizona.

Mr. Gifford, now with the Weather Bureau, did his measurement translating at Lowell for the Planetary Atmosphere Project under a contract from the Air Force. He found, for the first time, evidence of a lag in the annual mean temperature of Mars' surface behind the sun's movement.

This was in good relationship with a daily lag which also showed up in his calculation, confirming previous evidence of such a lag. The hottest time of the day on Mars is about one hour and a half after noon, the calculations show.

Presence of such lags, Mr. Gifford said, gives further confirmation of the presence of an atmosphere on Mars.

Science News Letter, April 11, 1953

INVENTION

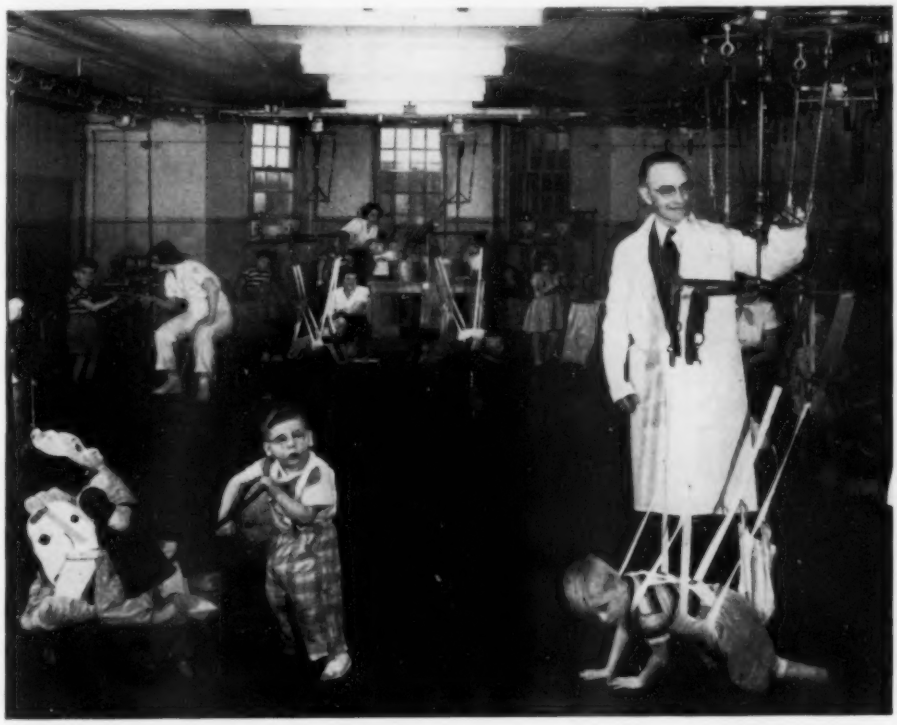
Sikorsky Patents New Helicopter Rotor

➤ IGOR I. SIKORSKY, father of the modern helicopter, has received a patent from the government for a helicopter rotor.

The long-time airplane and helicopter designer assigned his patent, number 2,627,929, to the United Aircraft Corp., East Hartford, Conn.

The new rotor, Mr. Sikorsky says in the patent, is designed to provide "a helicopter which is safer and easier to fly, and which will reduce pilot fatigue and the presently required pilot training time."

Science News Letter, April 11, 1953



HARTWELL CARRIER—Children of Denmark who are victims of cerebral palsy have just received a unique gift, the Hartwell Carrier. An adaptation of the overhead trolley conveyor system used by industry, it has proved unusually successful at the University of Rochester Medical Strong Memorial Hospital, N. Y., in helping cerebral palsy youngsters overcome disabilities.

GENERAL SCIENCE

African Science Advances

➤ ALL THE continent of Africa south of the Sahara Desert is being drawn together in a new scientific bootstrap operation.

This was made clear during a visit to SCIENCE SERVICE by Dr. E. B. Worthington, secretary-general of the Scientific Council for Africa, set up only two and a half years ago by the governments of Belgium, France, Portugal, Great Britain, the Union of South Africa and Southern Rhodesia.

The Council, Dr. Worthington said, is a non-governmental organization of scientists from all over Africa. It hopes by the exchange of scientific and technical information, by joint studies and research, to bring about improvement in the living standards of the African peoples. Better relations between the various nations and colonies and between the various races may result partly from the sociological studies carried on by the Council, Dr. Worthington indicated.

Work is already well ahead in geological surveys, mapping of territories, housing and water conservation. Nutrition and disease remain two of the biggest problems to be solved in Africa. Dr. Worthington emphasized that there is no strictly scientific or medical solution to these two problems.

Overcrowding in some areas, poor living and working conditions in others and a general lack of knowledge, all contribute to and complicate the problems of nutrition and health. Through a sharing of knowledge among scientists, including sociologists, solutions may be found, he said.

"So far in the history of Africa," Dr. Worthington said, "the scientist has been following, rather than leading, and often striving unsuccessfully to catch up with the administrator and the politician. But we have now in Africa some system for a better international approach. Perhaps from these small beginnings we may see in the field of international relations the scientists occasionally pointing the way, going forward and, I hope with politeness, opening the door."

To help African scientists overcome the relative isolation in which many of them have to work, the Council is giving high priority to the coordination of library and information services.

A directory of scientific and technical libraries in Africa south of the Sahara is being put together. When that is completed, lists of the periodicals held in these libraries will be prepared, and finally, the Council plans to compile detailed catalogues of the libraries' holdings.

Science News Letter, April 11, 1953

STATISTICS

Men Outnumber Women In Down-Under Countries

➤ GIRLS LOOKING for a man might consider a trip to Australia or New Zealand. Those two countries and the Union of South Africa, India, Pakistan and the Philippine Islands are the only places left in the world where males outnumber females, Metropolitan Life Insurance statisticians report.

Largest deficit of males in the world, probably, is in eastern Germany, where there are only 743 males for every 1,000 females. Figures for the Soviet Union are not available since World War II, but in 1939, even before the heavy losses in that war, there were only 920 males for every 1,000 females.

Science News Letter, April 11, 1953

MEDICINE

Say "Loose," Not "Tight," From Liquor

➤ THE WORD is "loose," not "tight," to describe the state of a person who has been drinking alcoholic beverages, says Dr. Robert V. Seliger, executive director of the National Committee on Alcohol Hygiene, Baltimore.

"One gets loose in all spheres of activity," Dr. Seliger explains. The reason is that alcohol, contrary to popular opinion, is not a stimulant but a depressant, especially to the higher brain centers.

Dr. Seliger's committee is calling for greater action on a community level in the treatment and prevention of alcoholism. A Los Angeles project has been cited as an example of an approach a city can make to its specific type of alcohol problem. Los Angeles, which on an ordinary day may have up to 3,400 in jail on drunkenness charges, has established a ranch-type farm which can care for 600 alcoholics, "under conditions which have been carefully planned to help restore them to useful living."

Dr. Seliger said this program promises rehabilitation for a large number of these unfortunate men and women.

Science News Letter, April 11, 1953

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TRUCK TIRE has a revolutionary tubeless design said to permit the tire to be changed on trucks as easily as automobile tires are changed. The tire fits a special one-piece drop-center rim that does not have the customarily high holding-flanges.

Science News Letter, April 11, 1953

LIGHTNING ARRESTER attaches to 300-ohm UHF down-lead to provide protection to television sets. Unlike some other arresters, the device does not produce ghosts or other interference on ordinary UHF video reception, the manufacturer states.

Science News Letter, April 11, 1953

MAGNETIC KNIFE holder accommodates five kitchen knives from a small paring knife to a long ham slicer. Made of natural finished maple, the device can be screwed to a kitchen wall. It has an inset magnetic bar that holds the knife blades in place. The knife handles rest in a recessed groove at the bottom of the holder.

Science News Letter, April 11, 1953

BABY APRON slips over the baby's head and fans out into a cover for a high chair tray, thus letting the baby eat by himself without spilling food on his clothes or the chair. The plastic apron also ties to the

rear legs of the high chair, as shown in the photograph, so that the child cannot stand up in the chair.

Science News Letter, April 11, 1953

GYROSCOPE, said to be the smallest ever made in this country and possibly in the world, is about half the size of an ordinary flashlight cell. Working on 6.3 volts of 400-cycle alternating current, the lightweight gyro rotor spins 24,000 times a minute and can be used where ruggedness is a desired quality.

Science News Letter, April 11, 1953

TRIM-BOARD CUTS with a self-sharpening, rotating wheel-blade instead of a knife. Enclosed in a protective cast-aluminum carriage, the wheel-blade mechanism travels on a solid I-Beam track and will cut paper, film and blueprints.

Science News Letter, April 11, 1953

CIRCUIT BREAKER for houses screws into the fuse socket just like the fuse itself. Available in 15, 20 and 30 amp sizes, the device "blows" when short circuits or electrical overloads occur, but can be reset when a button on its face is depressed. This turns the electricity back on.

Science News Letter, April 11, 1953

LIGHTING UNIT for decorative and functional outdoor use is weatherproof and is offered with a choice of mounting brackets, one of which adapts it for indoor use. All medium-base sealed-beam type lamps fit the unit, the maker reports.

Science News Letter, April 11, 1953

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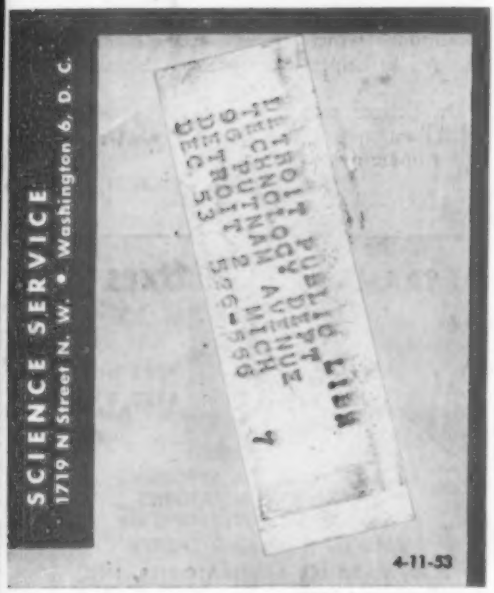

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Do You Know?

Thomas *Jefferson* invented the swivel chair.

Nearly 10 quarts of *milk* are required to make a pound of butter.

Barnacles grow on the skins of whales as well as on the hulks of ships.

Enough *magnesium* exists in ocean water to cover the entire earth to a depth of nine feet.

The first *railroad rails* were wooden; thin strips of iron fastened to the rails provided a running surface for the trains' wheels.

Maraschino cherries are bleached white with sulfur dioxide, then dyed a brilliant red or green with pure vegetable dyes.

It takes *light* about eight minutes to reach the earth from the sun, but it gets here from the moon in only 1.3 seconds.

During the last 10 years more than half of the *disabled veterans* who received training under Public Law 16 have been rehabilitated to the point where they can earn a living as trained workers.